

Appl. No. 09/844,345  
Amdt. Dated May 19, 2006  
Reply to Final Office action of March 13, 2006

### **REMARKS/ARGUMENTS**

Claims 1-38 are pending in the present application. This response is submitted concurrently with a Request for Continued Examination (RCE).

This response is in response to the Final Office Action mailed March 13, 2006. In the Final Office Action, the Examiner rejected claims 1-38 under 35 U.S.C. §101, second paragraph; claims 1-38 under 35 U.S.C. §112; and claims 1-38 under 35 U.S.C. §102(b). New claims 39-42 are added. Applicant submits the newly added claims 39-42 introduce no new matter. Reconsideration in light of the amendments and remarks made herein is respectfully requested.

#### ***Response to Examiner's Arguments***

1. Regarding the rejection of claims 1, 15, and 29, the Examiner contends that Binkley discloses transfer function which describes how a vertex affects the solution as a function of the behavior of other vertices (Final Office Action, page 11). Applicant respectfully disagrees. Binkley explicitly discloses that "[e]ach edge is labeled either true or false." (Binkley, section 2.1, The System Dependence Graph). A label of true or false does not correspond to a transfer function.

The Examiner also failed to respond to Applicant's argument that Binkley merely discloses copying the vertices, not pruning the graph.

2. Regarding the 101 rejection, the Examiner did not respond to Applicant's substantive argument presented in the previously filed response. Applicant specifically requests the Examiner to directly respond to Applicant's arguments as follows. The elements of statutory subject matter include:

Practical application: Optimizing the IPA process.

Concrete: local graphs representing local problems, separately compilable components, software program.

Tangible: separately compilable components, software program.

Useful: The local-interprocedural problems are constructed for each translation unit, reduced, and merged together into a global problem to be solved. The claimed process is useful in the translation unit art.

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***Rejection Under 35 U.S.C. § 101***

1. In the Final Office Action, the Examiner rejected claims 1-38 under 35 U.S.C. §101 on the grounds that the claims are directed to an abstract idea which is non-statutory subject matter. Applicant respectfully traverses the rejection for the following reasons.

In the Final Office Action, the Examiner stated that “[c]laims 1-38 are non-statutory because they are directed to a ‘method’, ‘product’, and ‘system’” with a single step.” (Final Office Action, page 2, paragraph number 4). Applicant respectfully disagrees. First, the Examiner has not cited any authority, from CFR, MPEP, or case laws, to support his contention the “a single-step process is non-statutory”. Second, although claim 1 may recite a single operation of “pruning”, subsequent dependent claims do not recite a single operation. For example, claim 2 recites “associating a use attribute, associating an affect attribute, and pre-solving a subgraph”, claim 4 recites “solving a global problem to optimize a recompilation ...”, etc.

The Examiner further stated that “[t]he claims merely recite a ‘method’ comprising pruning local graphs without further describing what the pruning steps is and/or how the pruning steps is performed creating any functional interrelationships among the [pruning] steps” (Final Office Action, page 2, paragraph number 4). The Examiner further stated that “[s]imply reciting what the local graphs are does not provide any functional interrelationships with the pruning steps.” (Final Office Action, page 2, paragraph number 4). The Examiner then concludes that “Thus the claims represent non-functional descriptive material that is not capable of producing a useful result, and hence represent only abstract ideas. Therefore, the claims are non statutory.” (Final Office Action, page 2, paragraph number 4). Applicant respectfully disagrees for the following reasons.

The claimed process is statutory if it is limited to a practical application of the abstract idea or mathematical algorithm in the technological arts. See *Alappat*, 33 F.3d at 1543, 31 USPQ2d at 1556-57 (quoting *Diamond v. Diehr*, 450 U.S. at 192, 209 USPQ at 10). See also *Alappat* 33 F.3d at 1569, 31 USPQ2d at 1578-79 (Newman, J., concurring) (“unpatentability of the principle does not defeat patentability of its practical applications”) (citing *O'Reilly v. Morse*,

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56 U.S. (15 How.) at 114-19). A claim is limited to a practical application when the method, as claimed, produces a concrete, tangible and useful result; i.e., the method recites a step or act of producing something that is concrete, tangible and useful. See *AT&T*, 172 F.3d at 1358, 50 USPQ2d at 1452.

Here, the claims recite pruning local graphs representing local problems which correspond to separately compilable components in a software program. Pruning local graphs representing local problems is limited to a practical application of inter-procedural analysis (IPA) solver. It provides a concrete result to optimize the IPA process for separately compilable software entities. Separately compilable components correspond to tangible and useful result, not abstract ideas. The local-interprocedural problems are constructed for each translation unit, reduced, and merged together into a global problem to be solved. Therefore, they represent useful results for the translation unit arts. The claims recite manipulation (e.g., pruning) of concrete entities (e.g., local graphs representing local problems which correspond to separately compilable components). Therefore, they are statutory.

Accordingly, Applicant respectfully requests the rejection under 35 U.S.C. §101 be withdrawn.

#### ***Rejection Under 35 U.S.C. § 112***

2. In the Final Office Action, the Examiner rejected claims 1-38 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

The Examiner states that it is unclear "what the pruning local graphs step is and what is included and excluded" (Final Office Action, page 3, paragraph number 6). Applicant respectfully disagrees. Pruning local graphs clearly define the operation of "pruning". Applicant respectfully directs the Examiner's attention to the Specification, paragraph [0034] which describes the local graph pruning module 142 and the IPA solver used to optimize the IPA process for separately compilable software entities.

Therefore, Applicant respectfully requests the rejection under 35 U.S.C. §112 be withdrawn.

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***Rejection Under 35 U.S.C. § 102***

3. In the Final Office Action, the Examiner rejected claims 1-38 under 35 U.S.C. §102(b) as being anticipated by "Interprocedural Constant Propagation Using Dependence Graphs and a Data-Flow Model" ("Binkley"). Applicant respectfully traverses the rejection and contends that the Examiner has not met the burden of establishing a prima facie case of anticipation.

Binkley discloses an interprocedural constant propagation using dependence graphs and a data-flow model. The technique attempts to reduce the number of intermediate representations by unifying optimizations onto a common intermediate representation. The representation chosen is a variation of the program dependence graph, called the system dependence graph (SDG) (Binkley, second paragraph, section 1, Introduction). The optimization is interprocedural constant propagation. The goal is to identify variables whose values are constant throughout all possible executions of the program (Binkley, third paragraph, section 1, Introduction).

Binkley does not disclose, either expressly or inherently, (1) pruning local graphs representing local problems, the local problems corresponding to separately compilable components in a software program, (2) each of the local graphs having edges and vertices, each edge having a transfer function, each vertex having a value, and (3) values of each of the local graph forming a lattice under a partial ordering.

Binkley merely discloses a SDG which contains one procedure dependence graph (PDG) for each procedure in a system S connected by inter-procedural control- and flow-dependence edges. The PDG for procedure P contains vertices, which represent the components of P, and edges, which represent the dependence between these components (Binkley, third paragraph, section 2.1, The System Dependence Graph). Therefore, the PDG is not a local graph representing a local problem that corresponds to a separately compilable component in a software program. It is a global graph that represents every procedure in a program and the edges merely represent the dependence between the components, not a transfer function. The vertex represents the predicates of if and while statements, assignments statements, input statements, and output statements of P (Binkley, third paragraph, section 2.1, The System Dependence Graph). Therefore, it does not have a value.

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Furthermore, Binkley merely discloses an inter-procedural constant propagation. The technique involves adding the call-site rewrite rule to the inter-procedural algorithm (Binkley, first paragraph, section 3.2, Interprocedural Constant Propagation). The call-site rule introduces copies of vertices (Binkley, section 2.2, first paragraph under heading "Rewriting the SDG"). Since the vertices are copied, the graph is not pruned.

To anticipate a claim, the reference must teach every element of the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Vergegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the...claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ 2d 1913, 1920 (Fed. Cir. 1989). Since the Examiner failed to show that Binkley teaches or discloses any one of the above elements, the rejection under 35 U.S.C. §102 is improper.

Therefore, Applicant believes that independent claims 1, 15, 29, and newly added claim 39 and their respective dependent claims are distinguishable over the cited prior art references. Accordingly, Applicant respectfully requests the rejection under 35 U.S.C. §102(b) be withdrawn.

### ***37 CFR 1.105 Request for Information***

The Examiner states that the information on the version(s) of KAI C++ compiler released prior to 4/27/2000 is required to identify products and services embodying the disclosed subject matter of claims 1-38 (Final Office Action, page 14, paragraph number 2). Specifically, the Examiner inquires in questions 2.1 and 2.2 whether the subject matters in claims 1-38 are included in at least one of the released version(s).

Regarding question 2.1, Applicant submits that the subject matters in claims 1, 15, and 29 are NOT included in at least one of the released version(s).

Regarding question 2.2, Applicant submits that the subject matters in claims 2-14, 16-28, and 30-38 are NOT included in at least one of the released version(s).

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**Conclusion**

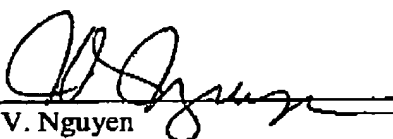
Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: May 19, 2006

By

  
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Tu Nguyen

May 19, 2006

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